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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/842,935	04/26/2001	Michael Kozhukh	INTL-0561-US (P11332)	1185

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EXAMINER

CHANG, AUDREY Y

ART UNIT	PAPER NUMBER
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2872

DATE MAILED: 09/18/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

09/842,935

Applicant(s)

KOZHUKH, MICHAEL

Examiner

Audrey Y. Chang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 July 2002.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6, 8-13 and 16-30 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-13 and 16-30 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: .

DETAILED ACTION

Remark

- This Office Action is in response to applicant's amendment filed on July 15, 2002, which has been entered as paper number 3.
- By this amendment, the applicant has amended claims 1, 8, 24 and 30 and has canceled claims 7, 14 and 15.
- Claims 1-6, 8-13, and 16-30 remain pending in this application.
- The rejection to claim 30 under 35 USC 112, first paragraph, set forth in the previous Office Action dated June 17, 2002 is **withdrawn** in response to applicant's amendment.
- The rejections under 35 USC 112, second paragraph, set forth in the previous Office Action still **hold**, for the reasons stated below.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-6, 8-13, 22, and 29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 8 have been amended to include the phrase "*about 700 to 750 Angstroms*" recited in claims 1, 8, 22 and 29 is indefinite since it is not clear to what degree should the thickness be interpreted here as "*about 700 to (about) 750 Angstroms*".

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The phrase "covered by insulator" recited in claim 4 is indefinite since it is not clear what is the *structural relationship* between this "insulator" and the "absorbing" layer recited in its based claim. This renders the scopes of the claim unclear. Claim 6 inherits the rejection from their based claim.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-6, 8-10, and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Li et al.

Li et al teaches a *color deformable mirror device* having a plurality of electronically controlled *micro-mirrors* that each is comprised of a *semiconductor substrate* (12, Figure 1) and a *mirror element* (16) formed over the substrate, (please see Figure 1). Li et al teaches that the mirror element (16) further comprises *metallic layer such as silver layer* (20) serves as the *reflective layer* and a *color coating layer* (24), serves as the *absorbing layer*, formed over the silver layer such that the color coating layer may be red, blue or green color coating such that it certainly include filter that would act to absorb blue light, (please see Figures 1 and 2, columns 5-6). Li et al further teaches that the color-coating layer may include layer materials such as *silicon dioxide* and *silicon nitride*, and the color coating layer may have multilayer structure, (please see column 6, lines 55-58). The method of forming the color deformable mirror device is implicitly included.

Claims 1 and 8 have been amended to include the feature having the layer thickness for the layer components in the color-coating layer to be between 700 to 750 Angstroms. Li et al reference does not such feature explicitly. However since Li et al teaches specifically that the color coating layer is designed

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to reflect red, *blue* and green colors respectively these layer thickness are either *inherently* met by the disclosure of the coating or an *obvious modifications* to one skilled in the art since it is well known in the art that layer thickness is an essential factor for adjusting the reflectance/transmittance spectrum for the thin film coating.

With regard to claims 12 and 13, Li et al teaches that the color-coating layer are formed by using *chemical vapor deposition process* (CVD) however it does not teach explicitly about the temperature used, (please see column 9). However this feature has to be either implicitly included or an obvious modification to one skilled in the art since the temperature setting is an essential and standard factor for carrying out the CVD process and it would be common knowledge to one skilled in the art to use proper temperature setting for forming the color coating.

5. Claims 16-18 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Jerman et al.

Jerman et al teaches an optical data storage system having a *plurality of micro-mirrors* (103) that each having a *silicon wafer* (691, Figure 10), serves as the *substrate* and a *reflective metal layer* such as *silver layer* (692) formed on the silicon substrate, wherein the silver metal layer is deposited at *room temperature* which is generally understood to be between 20 to 25 °C, (please see columns 16-18).

Jerman et al teaches that the mirror further comprises *dielectric multilayer* to form filter coating having quarter wave stack that implicitly has the function of absorbing certain spectrum of the incident light, (please see column 17, lines 13-24). This reference has met all the limitations of the claims with the exception that this reference does not teach explicitly that the silver layer is formed *directly* on the silicon wafer however such modification is considered to be obvious to one skilled in the art since whether to use an adhesion layer between the silver layer and the wafer to adhere the silver layer is an obvious matters of design choice to one skilled in the art.

6. **Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Li et al as applied to claim 8 above, and further in view of the patent issued to Jerman et al.**

The color deformable mirror device taught by Li et al as described for claim 8 above has met all the limitations of the claim with the exception that it does not teach explicitly that the reflective silver layer is deposited at 50 °C. Jerman et al in the same field of endeavor teaches micro-mirror having silver layer deposited on silicon wafer wherein the silver layer is deposited at room temperature (which is generally understood to be between 20 to 25 °C) in order to minimize their residual internal stress, (please see column 17, lines 6-8). It would then have been obvious to one skilled in the art to apply the teachings of Jerman et al to deposit the silver layer at room temperature for the benefit stated above.

7. **Claims 19-22 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Jerman et al as applied to claim 16 above, and further in view of the patent issued to Li et al.**

The micro-mirror taught by Jerman et al as described for claim 16 above has met all the limitations of the claims. Jerman et al teaches that the mirror may include dielectric multilayer structure that enhances the reflectivity and which implicitly absorbs certain spectrum of incident light. However this reference does not teach explicitly that the dielectric multilayer structure absorbs blue light and having the specific layer materials. *Li* et al in the same field of endeavor teaches a color deformable mirror device wherein color coating including red, blue and green filters are formed on the micro-mirrors respectively. Li et al further teaches that the color-coating layer may include layer materials such as *silicon dioxide* and *silicon nitride*, (please see Figures 1 and 2). It would then have been obvious to one skilled in the art to apply the teachings of Li et al to modify the micro-mirror of Jerman et al accordingly for the benefit of enhancing reflectivity for certain spectrum of light.

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With regard to claim 22, these references do not teach explicitly that the layer thickness for the layer components in the color-coating layer is of the claimed values. However since Li et al teaches specifically that the color coating layer is designed to reflect red, blue and green colors respectively these layer thickness are either inherently met by the disclosure of the coating or an obvious modifications to one skilled in the art since it is well known in the art that layer thickness is an essential factor for adjusting the reflectance/transmittance spectrum for the thin film coating.

With regard to claim 24, Li et al teaches that the color coating layer are formed by using *chemical vapor deposition process* (CVD) however it does not teach explicitly about the temperature used, (please see column 9). However this feature has to be either implicitly included or an obvious modification to one skilled in the art since the temperature setting is an essential factor and standard factor for carrying out the CVD process and it would be common knowledge to one skilled in the art to use proper temperature setting for forming the color coating.

8. Claims 25-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Li et al in view of the patent issued to Jerman et al.

Li et al teaches a *color deformable mirror device* having a plurality of electronically controlled *micro-mirrors* that is comprised of a *semiconductor substrate* (12, Figure 1) and a *mirror element* (16) formed over the substrate, (please see Figure 1). Li et al teaches that the mirror element (16) further comprises *metallic layer such as silver layer* (20) serves as the *reflective layer* and *color coating layer* (24), serves as the *absorbing layer*, formed over the silver layer such that the color coating layer may be of red, blue or green color coating which includes coating acts to absorb blue light, (please see Figures 1 and 2, columns 5-6). Li et al further teaches that the color-coating layer may include layer materials such as *silicon dioxide* and *silicon nitride*, and the color coating layer may have multilayer structure, (please

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see column 6, lines 55-58). The method of forming the color deformable mirror device is implicitly included.

This reference has met all the limitations of the claim with the exception that it does not teach explicitly that the semiconductor is silicon. However silicon is a very well known semiconductor wafer material as demonstrated by the teachings of Jerman et al. Jerman et al teaches a micro-mirror arrangement wherein the reflective silver layer is formed on a *silicon layer*, (please see Figure 10, column 16). It would then have been obvious to one skilled in the art to apply the teachings of Jerman et al to modify the deformable mirror device of Li et al by making the semiconductor wafer a silicon wafer since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416. Jerman et al further teaches to deposit the silver layer at room temperature for the benefit of minimizing the residual internal stress, (please see column 17, lines 5-8). It would have been obvious to adopt such depositing process for the benefit stated above.

With regard to claim 27 and *newly amended claim 30*, Li et al teaches that the color coating layer are formed by using *chemical vapor deposition process* (CVD) but it does not teach explicitly about the temperature used, (please see column 9). However this feature has to be either implicitly included or an obvious modification to one skilled in the art since the temperature setting is an essential factor for carrying out the CVD process and it would be common knowledge to one skilled in the art to use proper temperature setting for forming the color coating.

With regard to claim 29, Li et al does not teach explicitly that the layer thickness for the layer components in the color-coating layer is of the claimed values. However since Li et al teaches specifically that the color coating layer is designed to reflect red, blue and green colors respectively these layer thickness are either inherently met by the disclosure of the coating or an obvious modification to

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one skilled in the art since it is well known in the art that layer thickness is an essential factor for adjusting the reflectance/transmittance spectrum for the thin film coating.

Response to Arguments

9. Applicant's arguments filed on July 15, 2002 have been fully considered but they are not persuasive. The amended claims have been fully considered and they are rejected for the reasons stated above.

10. In response to applicant's arguments, which state that the cited Li et al reference does not give suggestion for achieving blue shift, which therefore differs from the instant application, the examiner respectfully disagrees. The applicant is respectfully reminded that such feature *is not* recited in the claims. Furthermore, it is the *standard knowledge* in the art that the thickness and the refractive index of the layer are the factors for designing an interference filter to have desired reflectance/transmittance characteristics. It is known in the art that there are known computer program for designing interference filter having desired transmittance/reflectance characteristics by changing layer thickness and refractive index. It is therefore an obvious matter of design choice for one skilled in the art to make the layer having certain thickness to achieve certain optical characteristics.

11. In response to applicant's argument concerning the cited Jerman reference teaches away from forming the silver layer directly on the silicon substrate, which therefore differs from the instant application the examiner respectfully disagrees. The applicant is respectfully reminded claim 16 *does not* recite the silver layer is *directly* on the silicon substrate.

12. In response to applicant's argument, which states that the cited Jerman reference teaches "metal layers may be deposited in a manner that minimizes their residual internal stress at room temperature" that does not suggest the metal layer is deposited at very low temperature, the examiner respectfully

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disagrees for the reasons stated below. It is well known in the art that in order to achieve minimized stress the metal layer *has to* be deposited at room temperature, which is between 20 to 25 degree Celsius. This is well disclosed and supported in the teachings of Grupp (PN. 6,261,943) column 5, lines 56-62.

13. In response to applicant's argument, which states that the phrase "covered by an insulator" is not indefinite the examiner disagrees respectfully. It is not clear if the phrase "covered by an insulator" means the insulator is *directly* covering the silver layer or not. This therefore introduces indefiniteness since there are other layers in the reflector.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US patent issued to Grupp (PN. 6,261,943) teaches meal layer should be deposited at room temperature in order to reduce stress.

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

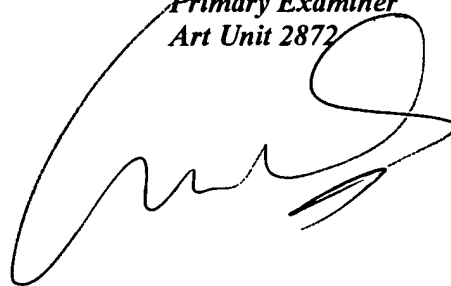
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 703-305-6208. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cassandra Spyrou can be reached on 703-308-1637. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Audrey Y. Chang
Primary Examiner
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A handwritten signature in black ink, appearing to be 'Audrey Y. Chang', written over the printed name and title.

A. Chang, Ph.D.
September 13, 2002